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No. 61—1913.

British Engineering Standards Association.

(*Incorporated 1918.*)

FORMED IN 1901 AS THE ENGINEERING STANDARDS COMMITTEE
BY
THE INSTITUTION OF CIVIL ENGINEERS.
THE INSTITUTION OF MECHANICAL ENGINEERS.
THE INSTITUTION OF NAVAL ARCHITECTS.
THE IRON AND STEEL INSTITUTE.
THE INSTITUTION OF ELECTRICAL ENGINEERS.

UNIVERSITY OF TORONTO
1920
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BRITISH STANDARD SPECIFICATION

FOR

COPPER TUBES

AND THEIR

SCREW THREADS

(PRIMARILY FOR DOMESTIC AND SIMILAR WORK).

LONDON:
PUBLISHED FOR THE ASSOCIATION BY CROSBY LOCKWOOD & SON,
7, STATIONERS' HALL COURT, LUDGATE HILL, E.C. 4; AND 5, BROADWAY, LONDON, S.W. 1;
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January, 1919.

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* Succeeded the late SIR JOHN WOLFE BARRY, K.C.B., February, 1918.

BRITISH ENGINEERING STANDARDS ASSOCIATION.

The following are lists of Members of the Sectional Committee on Screw Threads and Limit Gauges, and of the Sub-Committee on Metal Tubes and Connections.

SECTIONAL COMMITTEE ON SCREW THREADS AND LIMIT GAUGES.

April, 1913.

Chairman, ‡SIR H. FREDERICK DONALDSON, K.C.B.
Admiralty, Eng.-Rear-Admiral E. F. Ellis, R.N.
War Office, Mr. R. D. T. Heap.
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Crown Agents for the Colonies, Mr. Ashton M. Heath.
National Physical Laboratory, Dr. R. T. Glazebrook, C.B.
Institution of Mechanical Engineers, Mr. Michael Longridge; Mr. R. Matthews.
Institution of Naval Architects, *Mr. Sydney W. Barnaby.
Institution of Gas Engineers, Mr. James W. Helps.
Incorporated Institution of Automobile Engineers, Mr. A. Sharp.
Institute of Marine Engineers, Mr. D. Hulme; Mr. F. E. Pratten.
Locomotive Manufacturers' Parliamentary Association, Mr. Hugh Reid; Mr. W. Collingwood.
Association of Railway Locomotive Engineers, Mr. H. N. Gresley; †Mr. Henry Fowler.
British Tube Trade Association, Mr. A. W. Hutton; Mr. J. G. Stewart.
Brass and Copper Tube Association, Mr. W. W. Gibbins.

‡Sir William Preece, K.C.B.; Col. R. E. Crompton, C.B.; Col. H. C. L. Holden, C.B., R.A. (Ret.); Mr. H. I. Brackenbury (*Sir W. G. Armstrong, Whitworth & Co., Ltd.*); Mr. L. S. Crawshaw (*The Automatic Standard Screw Co.*); Mr. William Reavell (*Reavell & Co. Ltd.*); Mr. C. Salmon, Inspector of Machinery, R.N. (retired) (*Vickers Ltd.*); Mr. W. Taylor (*Taylor, Taylor & Hobson, Ltd.*).

* Retired November, 1912.
† Succeeded Mr. J. G. Robinson, December, 1912.
‡ Since deceased.

SUB-COMMITTEE ON METAL TUBES AND CONNECTIONS.

April, 1913.

Chairman, COL. H. C. L. HOLDEN, C.B., R.A. (Ret.).
Institution of Heating and Ventilating Engineers, Mr. Chas. R. Honiball.
National Association of Master Heating and Domestic Engineers, Mr. W. L. White.
*Joint Committee on Screwed Copper Pipe Standards**, Mr. W. Nelson Haden.
Brass and Copper Tube Association, Mr. W. W. Gibbins.

Mr. G. A. Burls; Col. R. E. Crompton, C.B.; Mr. J. H. Clements (*Clements, Jeakes & Co.*); Mr. H. N. Gresley (*Great Northern Railway Co.*); Mr. H. L. Reason (*John Russell & Co. Ltd.*); Mr. O. M. Row (*Royles Ltd.*); Mr. F. Tomlinson (*The Broughton Copper Co., Ltd.*).

* Appointed by the Institution of Heating and Ventilating Engineers and the National Association of Master Heating and Domestic Engineers.

PREFACE.

The standardisation of Copper Tubes was first considered in connection with a Report made by the late Mr. Henry Lea to the Sectional Committee on Screw Threads and Limit Gauges in October, 1911.

The consideration of this subject, together with the question of standardising Union Joints and other Tube Connections, resulted in the appointment of the Sub-Committee on Metal Tubes and Connections, which appointment was confirmed by the Main Committee on July 18th, 1912.

The Sub-Committee have adopted British Standard Pipe Threads for the heavier Gauge Tubes, and the recommendations of the Sectional Committee on Screw Threads and Limit Gauges as to the gauging of Pipe Threads have been largely followed in this Report.

In drawing up their recommendations, the Sub-Committee availed themselves of the information previously obtained by the Joint Committee on Screwed Copper Pipe Standards appointed by the Institution of Heating and Ventilating Engineers and the National Association of Master Heating and Domestic Engineers, and they desire to record their appreciation of the information placed at their disposal by the Joint Committee and of the pioneer work undertaken by them.

They also desire to record their high appreciation of the valuable services rendered by their late Chairman, Mr. Henry Lea, whose death on July 20th, 1912, in the midst of their deliberations, deprived the Sub-Committee of the intimate knowledge possessed by him of the various points under consideration.

This report was adopted by the Sectional Committee on Screw Threads and Limit Gauges at their meeting held on March 11th, 1913.

This Report was approved by the Main Committee at their meeting held on March 12th, 1913.

NOTE.—*The Association desires to call attention to the fact that this Specification is intended to include the technical provisions necessary for the supply of the material herein referred to, but does not purport to include all the necessary provisions of a Contract.*

BRITISH STANDARD SPECIFICATION FOR COPPER TUBES (SUITABLE FOR SCREWED CONNECTIONS).

Classification.

1. Three classes of Tube are dealt with in this Specification, viz.: —

Low Pressure (Table I.)
Medium Pressure (Table II.)
High Pressure (Table III.)

Chemical Analysis.

2. The Tubes must contain not less than 99·25 per cent. of Copper, and 0·25 per cent. to 0·45 per cent. must consist of Arsenic.

The Manufacturer shall supply an analysis when required to do so.

Freedom from Defects.

3. The Tubes must be clean, smooth, and free from surface defects or longitudinal grooving, internally and externally, and the ends must be clean and square.

Mechanical Tests.

4. The Manufacturer shall provide, at his own expense, extra Tubes at the rate of one per cent. of each diameter of Tube ordered under the contract, and the representative of the Engineer (or of the Purchaser) shall select and test such of the Tubes as he may think proper to the extent of such percentage. All test pieces shall be annealed before testing and must comply with the following mechanical tests without further annealing:—

Drifting Test.

5. The Tubes must stand drifting, as shewn in Fig. 1, without showing either crack or flaw, until the diameter of the drifted end measures at least 25 per cent. more than the original diameter of the Tube.

Fig. 1.

Flattening and Doubling over Test.

6. The Tubes must be capable of standing the following test, both cold and at a red heat, without showing either crack or flaw. A piece of the Tube shall be flattened down until the interior surfaces of the Tube meet as shewn in Fig. 2, and then be doubled over on itself, that is, bent through an angle of 180 degrees, the bend being at right angles to the direction of the length of the Tube, as shewn in Fig. 3.

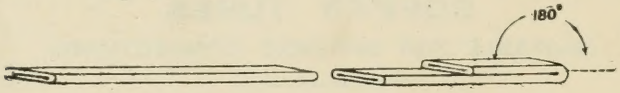

Fig. 2. **Fig. 3.**

Hydraulic Test.

7. All Copper Tubes shall be tested in accordance with their Classification by internal hydraulic pressure as follows :—

Classification of Tube.	Hydraulic Test Pressure.
Low Pressure (Table I.)	300 lbs. per sq. in.
Medium Pressure (Table II.)	300 lbs. per sq. in.
High Pressure (Table III.)	500 lbs. per sq. in.

General Dimensions of Tubes.

8. The standard size of any Tube shall be designated by the nominal size of bore given in the first column of Tables I., II. and III. All Copper Tubes purporting to be to British Standard Specification shall have the Inside and Outside Diameters given in columns 2 and 6 respectively of these Tables, subject only to the Tolerances* specified in Clause 9.

Tolerances.

9. The Outside Diameters of the Tubes shall not vary from the Standard Dimensions by more than the Tolerances given in Tables I., II. and III. (Column 7). No Tube shall at any point be thinner than the minimum thickness specified in Tables I., II. and III. (Column 5.)

Lengths of Tubes.

10. The requirements of this Specification relate to Tubes not exceeding fifteen feet in length.

Weight of Tubes.

11. The weight per lineal foot for Low and Medium Pressure Tubes shall be not less than the values given in Column 13, or more than the values given in Column 14 (Tables I. and II.), and for High Pressure Tubes not less than the values given in Column 17, or more than the values given in Column 18 (Table III.).

* The word "*Tolerance*" is defined as "A difference in dimension prescribed in order to tolerate unavoidable imperfections of workmanship."

Inspection and Additional Tests.

12. The representative of the Engineer (or of the Purchaser) shall be at liberty to reject any material that does not conform to the terms of this Specification. He will attend to stamp Tubes for tests or analyses before delivery.

Should any one of the Tubes first selected by the representative of the Engineer (or of the Purchaser) fail to pass the requirements of the mechanical tests or chemical analysis, two further Tubes from the same consignment shall be selected for testing and chemical analysis. Should two out of the above total of three Tubes so selected fail as to the requirements of either the mechanical tests or chemical analysis, the Tubes represented by the test specimens shall be liable to rejection.

Testing Facilities.

13. The Manufacturer shall supply the material required for testing free of charge, and shall, at his own cost, furnish and prepare the necessary test pieces, and supply labour and appliances for such testing as may be carried out on his premises in accordance with this Specification. Failing facilities at his own works for making the prescribed tests, the Manufacturer shall bear the cost of carrying out the tests elsewhere.

British Standard Copper Tubes.

14. The Committee recommend that all Copper Tubes made in accordance with the requirements of this Specification be known as :—

British Standard Low Pressure Copper Tubes (suitable for Screwed Connections.)

British Standard Medium Pressure Copper Tubes (suitable for Screwed Connections).

British Standard High Pressure Copper Tubes (suitable for Screwed Connections).

BRITISH
STANDARD SPECIFICATION
FOR
SCREW THREADS
(FOR COPPER TUBES AND THEIR CONNECTIONS).

When Tubes are required to be screwed they shall be so specified when ordering, and the following Specification shall be complied with: —

Form of Thread.

15. The Whitworth *form* of thread shall be employed on all Pipe-ends and in all Connections. The angle between the slopes, measured in the axial plane, shall be 55°, and the threads shall be rounded equally at crests and roots leaving a depth of thread approximately equal to 0·64 times the pitch. For simplicity the depths so derived have been approximated in Tables I., II. and III. and the depths there given shall be regarded as the Standard Depths.

All Threads cut on Tubes and in Connections purporting to be to British Standard Dimensions shall have the Gauge Diameters, Core Diameters, Number of Threads per inch and Lengths given in Tables I., II. and III.

Taper.

16. The Screw at the Pipe-end and in all connections shall be conical, being coned one-sixteenth of an inch ($\frac{1}{16}$ in.) measured on the diameter per inch of length.

Screwed Connections.

17. Screwed Connections for the Tubes shall be screwed with threads having their *gauge diameters and form* in accordance with the requirements of this Specification.

In the case of Couplers, in order to ensure that the Pipe-ends shall not butt against each other within the Coupler, and that a sufficient length of thread is comprised in each joint, the length of Thread within the Couplers shall be not less than twice the length of Thread on the Pipe ends, *i.e.*, not less than twice the values given in Tables I., II. and III. (Column 12).

The length of Thread within the screwed portion at the end of any screwed connection shall be not less than the minimum length of Thread on the corresponding Pipe-end (Tables I., II. III., Column 12).

Gauge Diameter of Connections.

18. The position of the Gauge Diameter in a Screwed Connection is at the outer end of the Connection.

TABLE I.—BRITISH STANDARD LOW PRESSURE COPPER TUBES.

(SUITABLE FOR SCREWED CONNECTIONS.)

(For Working Pressures up to 50 lbs. per square inch or a hydraulic head of 120 feet.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Nominal bore of Tube.	Inside Diameter.	Thickness of tube.			Outside Diameter.		Gauge Diameter.	No. of threads per inch.	Depth of thread.	Core Diameter.	Length of thread.	Standard weight in lbs. per lineal foot.	Maximum weight in lbs. per lineal foot.
		S.W.G.	Decimals.	Minimum.	Standard.	Tolerance.							
ins.	ins.		ins.	in.	ins.	in.	ins.		in.	ins.	ins.		
⅛	·125	16	·064	·056	·253	± ·003	·248	28	·0230	·202	5/16	·15	·157
¼	·25	15	·072	·064	·394	± ·003	·389	20	·0320	·325	⅜	·28	·294
⅜	·375	15	·072	·064	·519	± ·003	·514	20	·0320	·450	½	·39	·409
½	·5	15	·072	·064	·644	± ·003	·639	20	·0320	·575	½	·50	·525
⅝	·625	15	·072	·064	·769	± ·004	·764	20	·0320	·700	⅝	·61	·640
¾	·75	15	·072	·064	·894	± ·004	·889	20	·0320	·825	⅝	·72	·756
⅞	·875	15	·072	·064	1·019	± ·004	1·014	20	·0320	·950	¾	·82	·861
1	1·00	14	·080	·072	1·160	± ·004	1·155	20	·0320	1·091	¾	1·04	1·09
1¼	1·25	14	·080	·072	1·410	± ·004	1·405	20	·0320	1·341	⅞	1·29	1·35
1½	1·5	14	·080	·072	1·660	± ·004	1·655	20	·0320	1·591	⅞	1·53	1·6
1¾	1·75	13	·092	·080	1·934	± ·004	1·929	16	·0400	1·849	1	2·05	2·15
2	2·00	13	·092	·080	2·184	± ·005	2·179	16	·0400	2·099	1	2·33	2·45
2¼	2·25	13	·092	·080	2·434	± ·005	2·429	16	·0400	2·349	1	2·61	2·74
2½	2·5	13	·092	·080	2·684	± ·005	2·679	16	·0400	2·599	1	2·88	3·02
2¾	2·75	13	·092	·080	2·934	± ·005	2·929	16	·0400	2·849	1	3·16	3·32
3	3·00	12	·104	·092	3·208	± ·005	3·203	16	·0400	3·123	1⅛	3·90	4·09
3¼	3·25	12	·104	·092	3·458	± ·005	3·453	16	·0400	3·373	1⅛	4·22	4·43
3½	3·5	11	·116	·104	3·732	± ·006	3·727	16	·0400	3·647	1⅛	5·07	5·32
3¾	3·75	11	·116	·104	3·982	± ·006	3·977	16	·0400	3·897	1⅛	5·42	5·69
4	4·00	10	·128	·116	4·256	± ·006	4·251	16	·0400	4·171	1¼	6·39	6·71

TABLE II.—BRITISH STANDARD MEDIUM PRESSURE COPPER TUBES.

(SUITABLE FOR SCREWED CONNECTIONS.)

(For Working Pressures up to 125 lbs. per square inch or a hydraulic head of 300 feet.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Nominal bore of tube.	Inside Diameter.	Thickness of tube.			Outside Diameter.		Gauge Diameter.	No. of Threads per inch.	Depth of thread.	Core Diameter.	Length of thread.	Standard weight in lbs. per lineal foot.	Maximum weight in lbs. per lineal foot.
		S.W.G.	Decimals.	Minimum.	Standard.	Tolerance.							
ins.	ins.		in.	in.	ins.	in.	ins.		in.	ins.	ins.		
⅛	·125	16	·064	·056	·253	± ·003	·248	28	·0230	·202	5/16	·15	·157
¼	·234	14	·080	·072	·394	± ·003	·389	20	·0320	·325	⅜	·29	·304
⅜	·359	14	·080	·072	·519	± ·003	·514	20	·0320	·450	½	·41	·430
½	·484	14	·080	·072	·644	± ·003	·639	20	·0320	·575	½	·53	·556
⅝	·609	14	·080	·072	·769	± ·004	·764	20	·0320	·700	⅝	·67	·703
¾	·710	13	·092	·080	·894	± ·004	·889	20	·0320	·825	⅝	·89	·934
⅞	·835	13	·092	·080	1·019	± ·004	1·014	20	·0320	·950	¾	1·03	1·08
1	·952	12	·104	·092	1·160	± ·004	1·155	20	·0320	1·091	⅞	1·33	1·40
1¼	1·202	12	·104	·092	1·410	± ·004	1·405	20	·0320	1·341	⅞	1·64	1·72
1½	1·452	12	·104	·092	1·660	± ·004	1·655	20	·0320	1·591	⅞	1·96	2·06
1¾	1·726	12	·104	·092	1·934	± ·004	1·929	16	·0400	1·849	1	2·30	2·41
2	1·976	12	·104	·092	2·184	± ·005	2·179	16	·0400	2·099	1	2·61	2·74
2¼	2·202	11	·116	·104	2·434	± ·005	2·429	16	·0400	2·349	1	3·25	3·41
2½	2·452	11	·116	·104	2·684	± ·005	2·679	16	·0400	2·599	1	3·60	3·78
2¾	2·678	10	·128	·116	2·934	± ·005	2·929	16	·0400	2·849	1	4·34	4·56
3	2·952	10	·128	·116	3·208	± ·005	3·203	16	·0400	3·123	1⅛	4·77	5·01
3¼	3·202	10	·128	·116	3·458	± ·005	3·453	16	·0400	3·373	1⅛	5·16	5·42
3½	3·444	9	·144	·128	3·732	± ·006	3·727	16	·0400	3·647	1⅛	6·25	6·56
3¾	3·694	9	·144	·128	3·982	± ·006	3·977	16	·0400	3·897	1⅛	6·68	7·01
4	3·936	8	·160	·144	4·256	± ·006	4·251	16	·0400	4·171	1¼	7·93	8·33

TABLE III.—BRITISH STANDARD HIGH PRESSURE COPPER TUBES.

(SUITABLE FOR SCREWED CONNECTIONS.)

(For Working Pressures up to 200 lbs. per square inch).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Nominal bore of Tube.	Inside Diameter.	Thickness of tube.			Outside Diameter.		Gauge diameter.	No. of threads per in.	Depth of thread.	Core Diameter.	Length of thread.		Distance of Gauge Diameter from end of Pipe.			Standard weight in lbs. per lineal ft.	Maximum weight in lbs. per lineal ft.
		S.W.G	Decimals.	Minimum.	Standard.	Tolerance.					On pipe end. Min.	In coupler Min.	Standard.	Max.	Min.		
ins.	ins.		in.	in.	ins.	in.	ins.		in.	ins.	ins.	ins.	in.	ins.	in.		
⅛	·228	14	·080	·072	·388	±·003	·383	28	·0230	·337	⅜	¾	5/32 (·1563)	·18	·13	·30	·315
¼	·339	13	·092	·080	·523	±·003	·518	19	·0335	·451	7/16	⅞	3/16 (·1875)	·22	·16	·48	·504
⅜	·477	13	·092	·080	·661	±·003	·656	19	·0335	·589	½	1	¼ (·2500)	·29	·21	·63	·661
½	·622	12	·104	·092	·830	±·003	·825	14	·0455	·734	⅝	1¼	¼ (·2500)	·29	·21	·91	·955
⅝	·675	11	·116	·104	·907	±·004	·902	14	·0455	·811	⅝	1¼	¼ (·2500)	·29	·21	1·11	1·17
¾	·814	11	·116	·104	1·046	±·004	1·041	14	·0455	·950	¾	1½	⅜ (·3750)	·44	·31	1·30	1·36
⅞	·962	11	·116	·104	1·194	±·004	1·189	14	·0455	1·098	¾	1½	⅜ (·3750)	·44	·31	1·51	1·59
1	1·058	10	·128	·116	1·314	±·004	1·309	11	·0580	1·193	⅞	1¾	⅜ (·3750)	·44	·31	1·84	1·93
1⅛	1·209	9	·144	·128	1·497	±·004	1·492	11	·0580	1·376	⅞	1¾	⅜ (·3750)	·44	·31	2·36	2·48
1¼	1·367	9	·144	·128	1·655	±·004	1·650	11	·0580	1·534	1	2	½ (·5000)	·58	·42	2·63	2·76
1⅜	1·462	9	·144	·128	1·750	±·004	1·745	11	·0580	1·629	1	2	½ (·5000)	·58	·42	2·80	2·94
1½	1·599	9	·144	·128	1·887	±·004	1·882	11	·0580	1·766	1	2	½ (·5000)	·58	·42	3·04	3·19
1⅝	1·799	9	·144	·128	2·087	±·004	2·082	11	·0580	1·966	1⅛	2¼	⅝ (·6250)	·73	·52	3·38	3·55
1¾	1·833	9	·144	·128	2·121	±·004	2·116	11	·0580	2·000	1⅛	2¼	⅝ (·6250)	·73	·52	3·44	3·61
1⅞	1·961	9	·144	·128	2·249	±·005	2·244	11	·0580	2·128	1⅛	2¼	⅝ (·6250)	·73	·52	3·67	3·85
2	2·064	9	·144	·128	2·352	±·005	2·347	11	·0580	2·231	1⅛	2¼	⅝ (·6250)	·73	·52	3·85	4·04
2¼	2·272	8	·160	·144	2·592	±·005	2·587	11	·0580	2·471	1¼	2½	11/16 (·6875)	·80	·57	4·71	4·95
2½	2·613	7	·176	·160	2·965	±·005	2·960	11	·0580	2·844	1¼	2½	11/16 (·6875)	·80	·57	5·94	6·24
2¾	2·863	7	·176	·160	3·215	±·005	3·210	11	·0580	3·094	1⅜	2¾	13/16 (·8125)	·95	·68	6·47	6·79
3	3·081	6	·192	·176	3·465	±·005	3·460	11	·0580	3·344	1⅜	2¾	13/16 (·8125)	·95	·68	7·60	7·98
3¼	3·321	6	·192	·176	3·705	±·005	3·700	11	·0580	3·584	1½	3	⅞ (·8750)	1·02	·73	8·16	8·57
3½	3·531	5	·212	·192	3·955	±·006	3·950	11	·0580	3·834	1½	3	⅞ (·8750)	1·02	·73	9·60	10·08
3¾	3·781	5	·212	·192	4·205	±·006	4·200	11	·0580	4·084	1½	3	⅞ (·8750)	1·02	·73	10·24	10·75
4	3·991	4	·232	·212	4·455	±·006	4·450	11	·0580	4·334	1⅝	3¼	(1·0000)	1·17	·83	11·85	12·44

The dimensions of the Screw Threads given in the above Table are identical with those given in Report No. 21 for Iron and Steel Tubes.

APPENDICES.

Appendix I. Notes on Tables.

Appendix II. Definitions.

Appendix III. Notes on Gauging Screw Threads.

APPENDIX I.

NOTES ON TABLES.

Tables I. and II.—In domestic water supply, the *hydraulic head* shall be taken as the measurement from the top of the cold water cistern to the bottom of the boiler or steam or hot water heater as the case may be.

The outside diameters in both Tables are identical in order that the same screwing tackle may be used.

The Gauge Diameters have been taken as ·005 in. less than the standard outside diameters of the tubes, and the position has been fixed at a distance of ·75 times the length of the thread measured from the end of the Pipe.

Table III.—The Committee have preserved the old Whitworth Standards as far as possible in the simplified dimensions for screwing sizes on Tubes up to $2\frac{1}{4}$ ins. nominal bore. The Committee have been guided in fixing the Gauge Diameters of the larger screwing sizes by the advantages of making the outside Diameters of the Tubes even quarters of inches.

Columns 1 and 8 of the Table give the nominal Bore of the Tube and the full Diameter of the Screw in the Coupler for use with that Tube. The diameter of this Screw has been chosen, in all cases, so that the Coupler can be screwed by hand on to the Tube leaving from 4 to 8 threads exposed, and the positions of the Gauge Diameters given in Columns 14, 15 and 16, are those defined in Report No. 21 (Report on British Standard Pipe Threads).

Tables I., II. and III.—For the purpose of calculating the standard weights the specific gravity of Copper has been taken as 8·8917 or 0·3209 lbs. per cubic inch at a Temperature of 60° Fahrenheit.

APPENDIX II.

DEFINITIONS.

Gauge Diameter.—The Gauge Diameter is the full diameter of the Screw Thread on the Pipe-end measured at right angles to the axis of the pipe in a plane whose position with regard to the end of the pipe is given in Appendix III. (page 18). For a full definition see page 4, Report No. 21, British Standard Pipe Threads.

The following definitions of the elements of a Screw Thread, shewn in Figures 4 and 5, have been approved by the Committee for general use.

Fig. 4.

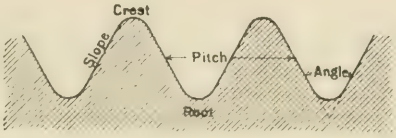

Fig. 5.

Effective Diameter of a Screw.—The effective diameter of a screw, having a single thread, is the length of a line drawn through the axis, and at right angles to it, measured between the points, where the line cuts the slopes of the thread. (Fig. 4.)

Core Diameter.—The Core Diameter is twice the minimum radius of a screw, measured at right angles to the axis. (Fig. 4.)

NOTE.—From Fig. 4 it will be seen that the "*core diameter*" of the male thread is measured between the roots of the thread; it should be borne in mind, however, that the "*core diameter*" of the female thread, being approximately the same dimension, is measured between the crests of the thread.

Full Diameter.—The Full Diameter is twice the maximum radius of a screw, measured at right angles to the axis. (Fig. 4.)

Crest.—The Crest is the prominent part of the thread, whether of the male screw or of the female screw. (Fig. 5.)

Root.—The Root is the bottom of the groove of the thread, whether of the male screw or of the female screw. (Fig. 5.)

Slope of Thread.—The Slope of the Thread is the straight part of the thread which connects the crest and root. (Fig. 5.)

Angle of Thread.—The Angle of the Thread is the angle between the slopes, measured in the axial plane. (Fig. 5.)

Pitch.—The Pitch is the distance in inches measured along a line parallel to the axis of the screw between the point where it cuts any thread of the screw and the point at which it next meets the corresponding part of the same thread. (Fig. 5.) The *reciprocal of the pitch* measures the number of turns per inch.

N.B.—The Committee recognise that it is the practice of the Tube Trade to make the thread on the conical ends of Pipes at right angles to the surface of the cone, in which case the pitch is the projection on to the axis of the Pipe of the distance between the points defined above measured along a line parallel to the surface of the cone.

APPENDIX III.

NOTES ON GAUGING SCREW THREADS.

The Committee are arranging to deposit with the National Physical Laboratory, for purposes of reference, a complete set of Standard Male Screw Gauges made in accordance with the sizes specified in Tables I., II. and III.

For the purposes of manufacture, the Committee recommend the adoption of two classes of Male and Female Screw Gauges, viz. :—

(I.) Reference Gauges.
(II.) Shop Gauges.

The Male Reference Gauges (I.) should be copies of the Standard Male Screw Gauges deposited with the National Physical Laboratory, and are intended for use by manufacturers and others when checking their own shop Gauges (II.).

The Male Reference Gauges should be verified, and their accuracy certified by the National Physical Laboratory.

The Shop Gauges, both Male and Female, are for use in the Shop to determine the accuracy of the work itself.

Gauge Diameter.—In order to ensure correct gauging it is necessary to define the position of the Gauge Diameter on the Pipe-end. The position of the Gauge Diameter on the Pipe-end is shown in Figs. 6 and 7.

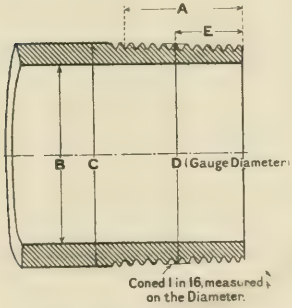

Fig. 6.
High Pressure Pipe-end.

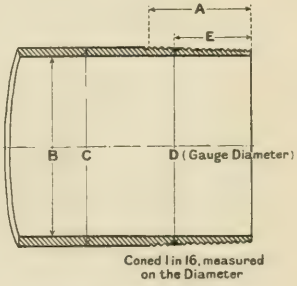

Fig. 7.
Low and Medium Pressure Pipe-end.

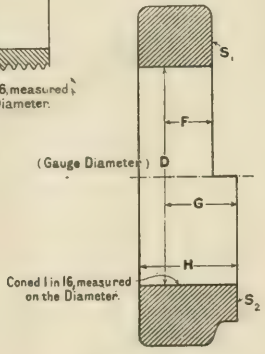

Fig. 8. Gauge.

For shop purposes to gauge the Pipe-end the Committee recommend the employment of a gauge of the type shewn in Fig. 8. The gauge having a plain internal conical surface, is slipped over the Pipe-end, and when pressed home by hand the Pipe-end must protrude beyond the Surface S_1, but not beyond the Surface S_2.

The relative position of the Gauge Diameter varies in the case of High Pressure Tubes (Table III.).

The dimensions of the Pipe-end and Gauge and the position of the Gauge Diameter may be obtained from the Table below.

Element.	Dimension.	
(See Figs. 6 and 7).	Low and Medium Pressure (Tables I. and II.).	High Pressure (Table III.)
A	Col. 12.	Col. 12.
B	Col. 2.	Col. 2.
C	Col. 6.	Col. 6.
D	Col. 8.	Col. 8.
E	·75**A.**	Col. 14.
F	**E** – ·075**A.**	Col. 16.
G	**E** + ·075**A.**	Col. 15.
H	0·9**A.**	0·9**A.**

For checking the accuracy of the pitch and form of thread a Comb Gauge should be employed.

British Engineering Standards Association.

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OF

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JANUARY, 1919.

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